

## An overview of the Reliance Jamnagar project



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### The Jamnagar complex

**R**eliance Petroleum's Jamnagar Refinery Complex is located 30 kilometers southwest of Jamnagar City, India, in the State of Gujarat. Jamnagar is the world's largest "grass roots" refinery project, with an estimated crude capacity of approximately 27 million tons per year. It is called a grass roots refinery because it was built at a new location all at once, from the ground ("grass roots") up, as opposed to additions to or refurbishment of an existing facility. The complex is spread over 8400 acres of land. The project is estimated to cost approximately INR 230 billion, which is approximately 5.3 billion US dollars.

The complex is divided into eight separate units or plants:

1. Crude Unit (Atmospheric/vacuum distillation)

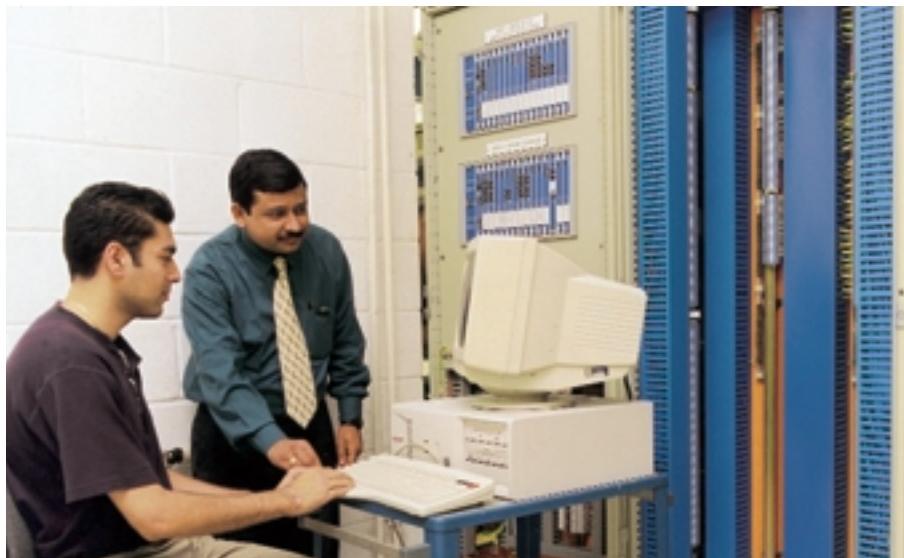
2. Fluidic Catalytic Cracking Unit (FCCU)
3. Aromatics
4. Captive Power Plant
5. Polypropylene
6. Delayed Coker
7. Hydrogen Manufacturing
8. Sulfur Recovery

### The Machinery Protection and Management System

Reliance chose Bently Nevada to supply a plantwide machinery protection and management system (MPMS) for all the critical and essential plant machinery. In 1996, when the project was in the planning stages, Reliance Industries and Bently Nevada jointly developed a plantwide machinery management philosophy. Together, they

then proceeded to develop the details of the systems to be used on individual pieces of machinery that were to be covered under this plantwide system. The subsequent Project Engineering, system layout, and detailed capabilities for the MPMS were all carried out by Reliance Industries in conjunction with Bechtel and Bently Nevada.

Two hundred and fifty rotating machines and fifteen reciprocating compressors, which are located throughout the complex, are included in this plantwide system. The complex will have the single largest installed base of Bently Nevada products in India, including transducer systems, machine protection systems, and state-of-the-art machinery management systems, such as Data Manager® 2000



Engineers from Reliance Industries and Bently Nevada, conducting a Factory Acceptance Test in Warrington, U.K.

for Windows NT® (DM2000) and Machine Condition Manager™ 2000 (MCM2000).

All the critical and essential machines in the complex are instrumented with appropriate machine protection systems and are connected to DM2000 data acquisition workstations. All these workstations are then linked together by an independent fiber-optic network that enables the plant managers to manage their machines from wherever they might be in the complex.

### **Delivering more than just hardware and software – delivering solutions**

For many years, Bently Nevada has been involved in developing specifications pertaining to machinery protection and management, and then delivering the hardware/software components that meet these specifications. Now, however, our scope is evolving to more frequently supplying all of the engineering services required to turn our hardware and software into a solution. All of this is accomplished by a skilled and experienced Bently Nevada Project Management Team. Jamnagar is an excellent example. When installing and commissioning the systems for that project using our local Indian service organization, the Product Service and Project Management teams remained at the site during the full duration of the project commissioning phase, which lasted through September 1999.

### **Project Management**

Many steps are involved in the effective implementation of a machinery protection and management system. These steps include sourcing required parts, designing the system, system installation, integration and commissioning, documentation, training the users, and turning it over to those who will operate it. These steps don't just

happen – they must be managed as a project. Of significant benefit to Reliance is the project management services they purchased, allowing us to fully manage and coordinate all of the various activities associated with the machinery protection and management system. We're also ensuring that all the details pertaining to the installation are being properly recorded for use by others in the future. We understand how frustrating it is to walk into a plant,



**3300 and 3500 Systems going through a Factory Acceptance Test in Warrington, U.K.**

ready to provide service or diagnostic assistance, only to be hampered by a lack of proper documentation regarding installation details, part number and configuration particulars, maintenance records, and other necessary reference material. When we manage a project, it's something we give particular attention to. Consequently, as the project proceeds, we're placing special emphasis on providing thorough, accurate documentation that will serve the plant's needs for many years to come. It will be possible for us to provide the part numbers, setpoint details, configuration information, etc., of all of the components used in the machinery

protection and management system within minutes of receiving a request from anyone working in the complex.

### **Product Service**

Systems, such as those installed at the Jamnagar Complex, represent a significant requirement for ongoing maintenance and optimization of the instrumentation, to ensure it is always working properly and at peak performance. To support this need, Bently Nevada India has established a full-time site office within the Reliance Refinery Complex in Jamnagar. A fully-trained Service Engineer will be available 24-hours a day and will work at the site for five years, even after the project is turned over to Reliance. The goal: to help their engineers and management efficiently maintain and manage the Bently Nevada systems. We will also maintain an on-site spares inventory to ensure on-time availability of spare parts.

### **System Integration Engineering**

At Jamnagar, Bently Nevada India's Project Management Team is actively involved in integrating our systems with Jamnagar's Foxboro I/A Series process control system (PCS). System integration includes interfacing our 3300 and 3500 Monitoring Systems with the Foxboro PCS and importing process data from the PCS into DM2000. This vibration and process data is used by MCM2000 to provide Actionable Information™ to plant operators and maintenance personnel.

### **Training**

In addition to a commitment to keep their systems maintained properly, Reliance Industries also understands that their personnel must understand how to use these systems to derive

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diagnose misalignment and distinguish it from other machinery problems.

- **Alignment Training** – hands-on training from Bently Nevada, showing you how to perform common alignment techniques.
- **Alignment Trainer** – a convenient simulator, similar in concept to our rotor kits, that allows you to simulate misalignment and correct it.
- **Field Alignment Kit** – the advanced tool you need to perform cold alignment procedures yourself.

We'll have much more to say about our powerful new Field Alignment Kit in the next issue of the ORBIT.

However, there's no need to wait until then to rely on Bently Nevada for your machinery alignment needs. Our service and training capabilities are available right now to ensure your machinery is aligned properly. Contact your nearest Bently Nevada sales and service professional today to learn more. ☺

*Jamnagar, continued from page 18*

maximum value from them.

Consequently, training also plays a very important role in the success of the Jamnagar project. Bently Nevada's Project Management Team has already conducted four training courses.

Another course will be conducted later. The courses are specifically designed to provide the background and fundamentals to help Reliance personnel efficiently and effectively manage their machines. To ensure the learning is more than just a "one time event," Bently Nevada's site representative at Jamnagar will also be actively involved in updating the training needs of the plant during the next five years.

### Conclusion

Jamnagar provides an excellent example of a large, complex application of Bently Nevada hardware and software. As such, it was a logical place for us to provide the services necessary to deliver a working system, not just box after box of parts for someone else to install, integrate, and commission. The ability for Bently Nevada to provide a complete scope of services, including project management, system integration, installation and commissioning, on-site training, spare parts management, and system maintenance and optimization was a significant factor in their decision to use Bently Nevada – not simply the quality of our hardware and software. By taking full advantage of these service offerings, the likelihood that Reliance will get full value from their Bently Nevada products is greatly increased. ☺